# SECTION 312000 - EARTHWORK

## PART 1 - – GENERAL

### 1.1 GENERAL

A. Requirements set forth herein are in addition to and shall be considered as complementary to the Terms and Conditions for Construction and the balance of Divisions 00 and 01 and Technical Specifications.

B. All Contractors, Subcontractors, Vendors and the like shall be required to familiarize themselves with said provisions.

### 1.2 SUMMARY

A. Provide all labor, equipment, materials, incidental work, and construction methods necessary to complete the earthwork which includes, but is not necessarily limited to the following:

1. Notifying all affected utility companies and Dig Safe before starting work
2. Excavation, fill, and backfill and compaction, to the lines and grades indicated on the Drawings, or as otherwise required.
3. Trench excavation, bedding and backfill for utilities, including compaction.
4. Excavation of unsuitable materials, including existing fill, under proposed foundation and footing areas.
5. Rough grading, subgrade preparation, proof rolling subgrades, placement, moisture conditioning and compaction of fills and backfill.
6. Protect and preserve all existing structures and utilities to remain.
7. Obtain and pay for all required permits, licenses, and approvals of appropriate municipal and utility authorities, prior to commencing the work of this Section, and pay costs incurred there from.
8. Removal of all excess excavated material in accordance with all local, state, and federal regulations.

### 1.3 RELATED WORK

A. The following items of related work are specified and included in other Sections of the Specifications:

1. Section 008100 SUPPLEMENTARY REQUIREMENTS
2. Section 012100 ALLOWANCES
3. Section 012300 ALTERNATES
4. Section 015639 TREE AND PLANT PROTECTION
5. Section 024113 SELECTIVE SITE DEMOLTION
6. Section 040305 CONSERVATION TREATMENT OF HISTORIC MASONRY WALL – ALTERNATE NO. 3
7. Section 311316 TREE PRUNING
8. Section 310510 SOILS AND AGGREGATES FOR EARTHWORK
9. Section 312500 SEDIMENTATION AND EROSION CONTROL
10. Section 329113 PLANTING SOILS
11. Section 329119 LANDSCAPE GRADING

## 1.4 REFERENCE STANDARDS

A. The following standards shall apply to the work of this Section.

1. American Society for Testing and Materials (ASTM):
   a. D 1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort
   b. D 2487 Classification of Soils for Engineering Purposes
   c. D 1556 Density of Soil In-Place by the Sand Cone Method
   d. D 2167 Density and Unit Weight of Soil In-Place by the Rubber Balloon Method
   e. D 2922 Density of Soil and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth)
   f. D 2937 Density of Soil In-Place by the Drive-Cylinder Method
   g. D 3017 Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
2. Commonwealth of Massachusetts Department of Transportation (MassDOT): Standard Specifications for Highways and Bridges
3. United States Department of Labor, Occupational Safety and Health Administration (OSHA).
   a. Regulations (Standards – 29 CFR), PART 1926 Safety and Health Regulations for Construction, Subparts A through Subpart CC as applicable, and, specific to this Section:
   b. Regulations (Standards – 29 CFR), PART 1926 Safety and Health Regulations for Construction, Subpart P - Excavations.

## 1.5 LAWS AND REGULATIONS

A. Work shall be accomplished in accordance with regulations of local, county, state and federal agencies and utility company standards as they apply.

B. Comply with the provisions of the Manual for Accident Prevention in Construction of the Associated General Contractors of America, Inc., and the requirements of the Occupational Safety and Health Administration, United States Department of Labor (OSHA).

C. Contractors shall notify Dig Safe of proposed excavation, demolition or explosive work in public or private ways, and utility company right-of-way or easement. The work shall be performed in such a manner, and with reasonable precaution taken to avoid damage to utilities under the surface in said areas of the work.

D. Contractor shall contact all utility companies whose utilities might be affected by the Work of this Section and notify these utility companies of contemplated excavation, work in public or private ways, and utility right-of-way easement. Contractor shall not commence work until all utility companies have responded and provided the necessary receipts. The work shall then be performed in such a manner, and with reasonable precaution taken to avoid damage to utilities under the surface in said areas of the work.

## 1.6 QUALITY ASSURANCE AND CONTROL

A. The Contractor shall retain and pay for the services of a soil testing agency to perform on-site observation during the placement of bedding, backfill and fill. See requirements under Article 1.7 in this Section. The testing agency shall perform in-place soil density testing to confirm that fill material has been compacted in accordance with the requirements of this Section. Contractor shall notify Owner's Representative at least 72 hours in advance of scheduled compaction testing. Cooperate fully in obtaining the information desired and allowing free access to the work. The services of the testing agency, may include, but not necessarily be limited to, density testing of compacted fill:

B. The presence of the Owner's Representative does not include supervision or direction of the actual work of the Contractor, her/his employees or agents. Neither shall the presence of the Owner's Representative, nor any observations and testing performed by them, nor failure to give notice of defects excuse the Contractor from defects discovered in her/his work.

C. Costs related to retesting due to unacceptable qualities of work and failures discovered by testing shall be paid for by the Contractor at no additional expense to Owner.

D. Materials which have been previously tested may be subjected to further testing from time to time and may be rejected if it is determined that they do not conform to the requirements of these Specifications. Rejected materials shall be removed from the work immediately when so directed by the Owner's Representative, notwithstanding the results of previous testing.

## 1.7 SOIL TESTING

A. Materials will be tested and observed as described in the following paragraphs. Cooperate by allowing free access to the work for selection of test materials and observations.

1. Testing methods shall comply with the latest applicable ASTM Standards specified.
2. During subgrade preparation, before placement of bedding material, concrete work mats, structural fill, or structural concrete, the Contractor's Testing Agency shall observe the subgrade and perform in-place soil density tests as required to confirm that the bearing characteristics of the subgrade are consistent with those anticipated in the geotechnical investigations. Earthwork activities performed without properly scheduled inspection are subject to removal and replacement or additional testing as directed by the Owner's Representative at no expense to the Owner.
3. During the placement of bedding, backfill and fill, in-place soil density testing shall be performed by the soil testing agency to confirm that fill material has been compacted in accordance with the requirements of this Section. The Owner's Representative may designate areas to be tested. Contractor shall notify Owner's Representative at least 72 hours in advance of scheduled compaction testing.
    a. Structures and Embankments. At least one density and moisture content test for each 2,500 square feet of surface area for each lift of fill at embankment, structure and manhole locations

b. Trench Excavations. At least one nuclear density and moisture content test shall be conducted at a maximum of 50-ft intervals for each lift of fill placed or as directed by the Owner's Representative.
c. Additional tests as determined by the Owner's Representative.
d. The Contractor is required to schedule pickup of the soil samples, collect the samples and transport and deliver the samples to the testing agency for Gradation and Proctor Density Testing. All soil proposed to be used by the Contractor must be approved by the Owner's Representative prior to use.

1.8 QUALIFICATIONS

A. The Contractor shall have at least five (5) years of experience with comparable work to the Work shown and specified, employing labor and supervisory personnel who are similarly experienced in this type of work.

B. The Contractor's surveyor shall be a Professional Land Surveyor or Professional Engineer, registered in the Commonwealth of Massachusetts and shall have at least five (5) years of experience in construction survey of the type required under this Contract and acceptable to the Owner's Representative.

C. The Contractor's geotechnical testing agency shall be an independent, licensed testing agency meeting the qualification of ASTM D 3740. The soil technician shall have minimum three (3) years demonstrated experience in earthwork and grading operations and satisfy the certification requirements of agency having local jurisdiction.

1.9 SUBMITTALS

A. Submit the proposed methods of construction, including earthwork operations, excavation limits, fill material moisture conditioning and handling, compaction equipment, and material sources for the various portions of the work. Coordinate this submittal with the submittals required by Section 31 5000 EXCAVATION SUPPORT AND PROTECTION.

B. Submit complete product data for materials specified in this Section.

C. Submit Contractor's and Geotechnical Testing Agency's qualifications as described in herein

D. Contractor shall certify in writing to the Owner that all debris generated from the work of this contract is legally transported off site and disposed of according to all local, state and federal regulations.

E. Compaction and laboratory test results of backfill materials under structures, appurtenances and pavements shall be provided to the Owner's Representative in draft form on a daily basis and in a formal summary report on a weekly basis.

1.10 COORDINATION

A. Prior to start of earthwork, the Contractor shall arrange an on-site pre-construction meeting with the Owner's Representative for the purpose of establishing the Contractor's

schedule of operations and scheduling observation and testing procedures and requirements.

B. As construction proceeds, the Contractor shall be responsible for notifying the Owner's Representative prior to the start of earthwork operations requiring observation and/or testing.

1.11 PROTECTION

A. All existing facilities including but not limited to structures, utilities, pavements, sidewalks, curbing, driveway aprons, fencing, landscaping and other improvements in the vicinity of the Contractor's operations shall be protected. All existing facilities damaged by the construction shall be replaced at no additional cost to the Owner with material fully equal to that existing prior to construction to the satisfaction of the Owner.

B. Design, furnish, install, monitor and maintain excavation support as required and as specified in Section 315000 EXCAVATION SUPPORT AND PROTECTION.

C. Protect existing structures and foundations from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

D. Excavations within the zone of influence of any existing structures or utility will require the use of excavation support system as specified in Section 315000. The zone of influence is defined as a line extending at least 1 foot beyond of edge of the foundation or spring line of utility, then outward and downward at a slope of 1 horizontal to 1 vertical.

E. Excavations below the level of the base of any adjacent foundation or retaining wall will not be permitted unless the design of the excavation and bracing includes an analysis of the stability of the structure supported by the foundation and as necessary, incorporates required bracing/underpinning of the foundation.

F. Furnish, install, monitor and maintain settlement monitoring as required and as specified in Section 315500

G. Buried structures, and utilities including those which project less than 18 inches above grade, which are subject to damage from construction equipment shall be clearly marked to indicate the hazard. Markers shall indicate limits of danger areas, by means which will be clearly visible to operators of trucks and other construction equipment, and shall be maintained at all times until completion of Project.

H. Locate and mark underground utilities to remain in service before beginning the work. Do not interrupt existing utilities except when authorized in writing by authorities having jurisdiction.

I. When an active utility line is exposed during construction its location and elevation shall be plotted on the Record Drawing by the Contractor and both the Owner's Representative and the Utility Owner notified in writing.

J. Provide barricades, fences, lights, signs, and all other safety devices required for the protection of the public.

1.12 LAYOUT AND GRADES (CONSTRUCTION CONTROL)

A. Contractor's surveyor is responsible for all construction layout and reference staking necessary for the proper control and satisfactory completion of all structures, cutting, filling, grading, drainage and utilities installation, fencing, curbing, and all other appurtenances required for the completion of the construction work and acceptance of the Contract as specified and as shown on the Drawings.

B. All construction layout, staking and surveying shall be performed by a Professional Land Surveyor or Professional Engineer registered by the Commonwealth of Massachusetts, experienced and skilled in construction layout, staking and surveying of the type required under this Contract.

C. The Contractor shall be responsible for the placement and preservation of adequate ties to all control points necessary for the accurate re-establishment of all base lines or center lines shown on the Drawings.

D. Coordinate the work of this item with the specified requirements in Section 018900 SITE CONSTRUCTION PERFORMANCE REQUIREMENTS.

1.13 DEFINITIONS

A. Mud: A soft, saturated, remolded soil resulting from the mixing of soil and water. Mud is construction debris that cannot be amended or ameliorated to return to functional use.

B. Debris: Mud, sticks, stones, trash, rubbish and any broken construction materials are considered debris under the terms of this Contract. Compacted topsoil and planting soils are also considered debris unless otherwise approved for re-use by the Owner's Representative. Any material identified by the Owner's Representative as unwanted or unsuitable to the site shall be considered debris.

C. Topsoil: The upper layer of the soil profile which is supporting the growth of vegetation as evidenced by the existence therein of numerous roots and other organic matter.

D. Unsuitable Materials: Unsuitable materials are materials determined by the Owner's Representative to be unsuitable for support of the proposed structures or facilities and include (but not limited to) existing fill and organics such as topsoil and subsoil, stumps, debris and other soft, loose, disturbed or deleterious material such as glass, cinders, wood, and metal.

E. Obstruction: An obstruction is defined as boulder over 1.5 cubic yards in volume in open areas and one-cubic yard in volume in trenches, and masonry or concrete that cannot be broken or removed by normal job equipment (power shovels, scoops, or D-8 bulldozers with ripper attachment) without the use of drills or hoe-ramming equipment. The classification does not include materials that can be removed by means other than drilling and blasting, drilling and wedging or hoe-ramming. Trenches in excess of ten feet (10-feet) in width and pits in excess of twenty feet (20-feet) in either length or width are classified as open excavation.

F. Bearing Zone of Foundations. Bearing zone is defined as 1 horizontal to 1 vertical (1H:1V) line sloping downward and outward from 1 foot outside the bottom exterior edge of foundation.

G. Trench: Trench shall be defined as an excavation of any length where the depth is greater than twice the width. All other excavations shall be defined as open excavations.

H. Invert: Invert is defined as the elevation at the inside bottom surface of the pipe or channel.

I. Bottom of Pipe: The words "bottom of the pipe" as used herein shall be defined as the base of the pipe at its outer surface.

1.14 SITE CONDITIONS

A. The Contractor shall become familiar with the existing conditions of the site, consult records and drawings of adjacent structures and of existing utilities and their connections, and note all conditions which may influence the work of this Section.

B. Boring logs, geotechnical laboratory results, and an exploration location plan are attached to this specification. The Contractor shall review available logs, records of explorations and geotechnical testing results and other pertinent data for the site and confirm its applicability to the project. After obtaining Owner's permission, take whatever additional subsurface explorations deemed necessary at no expense to the Owner.

C. If a potential conflict exists between the above referenced data and these technical specifications, the Contractor shall, immediately upon its discovery, request clarification from the Owner’s Representative.

D. By submitting a Bid, the Contractor affirms that they have carefully examined the site and all conditions affecting the Work under this Section. No claim for additional costs will be allowed because of lack of full knowledge of existing conditions as indicated in the Contract Documents, or obvious from observation at the site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All soil, aggregate, and filter fabric material specified for use in this Section are specified in Section 31 0510 SOIL AND AGGREGATES FOR EARTHWORK.

B. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep.

1. Tape Colors: Provide tape colors to utilities as follows:
    a. Red: Electric.
    b. Yellow: Gas or oil
    c. Orange: Telephone and other communications.

d. Blue: Water.
e. Green: Storm Sewer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Pre-Construction Meeting. Conduct Pre-construction meeting in accordance with the requirements of this Section.

B. Protection Fencing. Install the protection fencing in the locations shown on the Contract Documents and in accordance with Section 015626 TEMPORARY FENCING.

C. Excavation Support and Protection. Provide excavation support and protection in accordance with the requirements of Section 315100 EXCAVATION SUPPORT AND PROTECTION.

D. Erosion and Sedimentation Control. Install erosion and sedimentation control measures shown on the Contract Documents and in accordance with Section 312500 SEDIMENTATION AND EROSION CONTROL.

3.2 SOIL MANAGEMENT PLAN

A. If required a Soil Management Plan shall be prepared and payment for the SMP will be negotiated.

3.3 STRIPPING AND STOCKPILING TOPSOIL

A. In areas as indicated strip existing topsoil to avoid integration of subsoil or subgrade material into stockpiles in accordance with the requirements of this Section.

B. Stripping by machine will not be permitted in the vicinity of trees to remain and existing utilities which might be disturbed or damaged during stripping operations.

C. Strip all topsoil to their full depth within the Contract limits as indicated. Strip all unsuitable material to its full depth. Protect topsoil from contamination from other unsuitable materials.

D. All stockpiled topsoil shall be tested for suitability as a component of planting soil as specified, performed and paid for in Section 329113, PLANTING SOIL. If existing topsoil is deemed unsuitable for reuse under the work of Section 329113, it shall be removed from the site and disposed of in a legal manner.

3.4 STRIPPING AND REMOVING TOPSOIL AND SUBSOIL/SUBGRADE MATERIALS

A. In areas as indicated, strip existing topsoil and excavate subsoil or subgrade material in accordance with the requirements of this Section. Remove from the site.

## 3.5 STOCKPILING

A. The Contractor shall segregate excavated material into stockpiles depending on the type and reuse potential of the material. At a minimum, the following materials shall be segregated separately:

1. Topsoil;
2. Fill soils not containing debris, ash or organics;
3. Natural granular soils;
4. Mud;
5. Debris;
6. Unsuitable material; and
7. Soils exhibiting potential chemical contamination based on visual or olfactory evidence

B. No soils generated from any earthwork activity shall be deposited or stockpiled at any time so as to endanger portions of a new or an existing structure, either by direct pressure or indirectly by overloading banks contiguous to the operation. Stockpile soil materials away from edge of excavations.

C. Stockpiled material shall be stored so as not to interfere with the established sequence of the construction. If there is not sufficient area available for stockpiling within the limits of the project, the Contractor will be required to furnish her/his own area for stockpiling, and for moving the material back and forth from the storage area, at no additional cost to the Owner.

D. Should conditions make it impracticable or unsafe to stack material adjacent to excavations, the material that is not contaminated shall be hauled and stored at an approved location. When required, it shall be re-handled and used in backfilling at no additional cost to the Owner.

E. No excavated material shall be deposited within existing tree protection zones. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water away from existing drainage structures, ponds, basins, or wetland areas. Cover stockpiles to prevent wind-blown dust.

F. The Contractor shall provide and install all erosion control specified under the Section 312500 SEDIMENTATION AND EROSION CONTROL.

G. Stockpile topsoil in windrows in locations approved by the Owner's Representative. Windrows shall be no greater than 6-feet tall. Prevent erosion by placing windrows with long axes parallel to underlying contour.

## 3.6 GRADES AND ELEVATIONS

A. The Contract Documents indicate layout alignments and grade elevations establish the lines and grades in conformity with the Drawings. The Owner's Representative, however, may make such adjustments in the field in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.

B. Excavate all materials to the elevations, dimensions and form as shown on the Drawings and as specified for completion of site work. Excavate to elevations indicated or required within a tolerance of plus or minus 1 inch and as required to meet the following grading tolerances.

C. Grading shall be completed to meet or exceed the following tolerances of uniformity. Uniformity is defined as no variations in the surface materials, at the grades and slopes indicated on the drawings that exceed the listed tolerance over a length of ten (10) feet horizontally in any direction.

| Location | Tolerance |
|---|---|
| Top of Subgrade beneath Footings | 1/2 inch |
| Top of Subgrade beneath Paving | 1/2 inch |
| Top of Subgrade beneath Landscape Areas | 1 inch |
| Top of Aggregate Bases all locations/conditions | 1/4 inch |

D. The bottom of excavations shall be formed to provide a smooth, uniform slope and grade. The bottom of the excavated grade shall be free of pockets, depressions or ridges that would collect or concentrate water, silts or other such objectionable material.

E. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades. In the event the Drawings do not provide for positive drainage in all locations, notify the Owner's Representative immediately.

F. Establish and maintain suitable stakes over all areas to be graded as directed, specified or required. Maintain sufficient reference points at all times during construction to properly perform the contract installation.

3.7 ROUGH GRADING IN LANDSCAPE AREAS

A. Grade evenly to the lines and grades indicated on the Drawings and as specified herein.

B. Rough grading shall include the shaping, trimming, rolling, and refinishing of all surfaces of the subgrade and base courses, shoulders, and earth slopes in preparation for final, finish grading of planting soils and site improvements as shown on the Drawings. The rough grading of shoulders and sloped areas may be done by machine methods. Work shall be performed by tracked vehicles or wheeled vehicles with low ground pressure tires.

C. Traffic of men and equipment across soil subgrade areas shall be prohibited following excavation to the required lines and grades.

D. No stones larger than 3 inches in largest dimension shall be placed in upper 6 inches of the subgrade. Fill shall be left in a compacted state at the end of the workday and sloped to drain.

E. Slope grades to direct water away from buildings and to prevent ponding.

F. The Owner's Representative may make such adjustments in grades and alignments as are found necessary to avoid special conditions encountered.

G. Grading of Slopes: Coordinate the work of rough grading on slopes with the relevant provisions of Section 32 9119 LANDSCAPE GRADING of this Specification.

1. Slopes less steep than 3:1 rough grading shall conform to the following protocols.
   a. Verify that the existing, in situ soils drain freely and have been properly loosened by subsoiling operations.
   b. Scarify exposed surfaces to a depth of 6 inches.
   c. Upon achieving subgrade slopes, track the rough landform. Track the slope with cleated excavator tracks so that cleat indentations are pressed into the exposed soil. Tracks shall be generally horizontal, following contours of the landform.
   d. Tracking shall not be construed to be used for slope compaction. Its sole purpose is to provide indentations in the slope to reduce soil erosion prior to the final placement of planting soils.
   e. For landform development in areas too small for tracked equipment create horizontal indentations by hand tools.
   f. Spread planting soils in accordance with Section 329119 LANDSCAPE GRADING. In the event that spreading planting soil is delayed for more than one week, stabilize exposed subgrade on slopes 3:1 and shallower in accordance with the requirements of Section 312500 SEDIMENTATION AND EROSION CONTROL.
2. For slopes steeper than 3:1 rough grading shall conform to the above stated protocols with the following exception:
   a. Create steps in the subgrade slope to create horizontal terraces approximately 12 inches wide. Steps may be either mechanically shaped using plows, harrows or disking machines or formed by hand.
   b. The surfaces of the steps shall generally slope back into the hillside.
   c. Spread planting soils in accordance with Section 329119 LANDSCAPE GRADING.
   d. In the event that spreading planting soil will be delayed for more than one week, defer step construction work until time of landscape grading work. In this event stabilize exposed subgrade on 2:1 temporary slopes in accordance with the requirements of Section 312500.
3. If ground water breakout or seepage is encountered due to high water tables, install subsurface drainage to intercept all groundwater that would affect slope stability or bearing strength or create undesirable wetness. Compensation for all work and materials to control ground water breakout shall be determined before the conclusion of the contract. Do not delay work of slope construction and stabilization.

## 3.8 EXCAVATIONS

A. General Excavation

1. All material encountered during excavation shall be unclassified excavation and shall include the removal of boulders up to 1.5 cubic yards, earth, rock, concrete, reinforced concrete, covered pavements, abandoned utilities, abandoned foundations and all miscellaneous materials encountered as required for

excavation. Boulders and rock over 1.5 cubic yards shall be considered “Rock Removal” and shall be paid for under the requirements of Part 4 of this Section. “Rock Removal” quantities shall be reviewed daily at the end of the work shift with the Owner’s Representative to be eligible for payment.

2. Exercise care to preserve the material below and beyond the lines of excavation. Where excavation is carried out below indicated grade or beyond the lines of excavation, Contractor shall backfill and compact the over excavation with Structural Fill to the indicated grade, at no additional cost to the Owner. Do not over excavate below proposed design grades for the purpose of obtaining borrow for use off-site.
3. When underground utilities and/or piping are encountered, inspect to determine whether they are functioning or abandoned. Where the course of the work requires demolition of existing utilities, confirm the utility or pipes are abandoned before progressing with demolition.
4. Abandoned pipes and former foundations within the proposed areas to be developed and where shown on the plans shall be removed and properly backfilled with compacted structural fill. Abandoned utilities within proposed parking and landscape areas and more than 4 feet below proposed grade shall either be removed or the ends cut and filled with grout.
5. The Contractor shall follow a construction procedure that permits visual identification of the bearing soils.
6. The Contractor shall limit the excavation size such that the water can be handled by the Contractor's chosen method of dewatering, allowing visual observation of the excavation bottom, and allowing backfill to be placed in the dry.
7. Limits of excavation are such that all unsuitable material shall be removed in the manner specified below.
    a. Where soil has been softened or eroded by flooding, equipment, traffic, or placement during unfavorable weather, not adequately protected from unfavorable weather or such other conditions, it shall be removed and replaced by the Contractor with suitable material, and at no additional cost to the Owner, and under the continuous observation of the Owner’s Representative. The Contractor shall make every effort to protect excavated soil from inclement weather, including but not limited to protection with plastic sheeting.
8. Grade areas adjacent to excavations to prevent surface water run-off into excavation or to adjacent properties.
9. If practical, excavation to final subgrade elevation should be performed using a smooth-edged bucket to minimize possible disturbance to the subgrade.
10. Reuse of Excavated Material
    a. Excavated material at the Site shall be reused on Site to the extent allowed by the Specifications and off-site disposal of excess materials will only be allowed upon written authorization of the Owner.
    b. Classification of excess material (if any) will be the responsibility of the Owner’s Representative.
    c. Excavated material shall be reused on the site, provided it meets the gradation requirements for the intended use in Section 310510 SOILS AND AGGREGATES FOR EARTHWORK.
11. On-Site existing asphalt and underlying base course may be reclaimed and reused as pavement base course or subbase fill on site in parking areas provided they are processed to meet the gradation requirements of the intended use in Section 310510 SOILS AND AGGREGATES FOR EARTHWORK.

B. Potentially Contaminated Materials – supplementing requirements specified elsewhere in this Section.

1. The Contractor shall be familiar with the local, state and federal regulations [Massachusetts Department of Environmental Protection (MassDEP) Hazardous Waste Regulations 310 CMR 30.00 and the Massachusetts Contingency Plan (MCP) 310 CMR 40.00] when conducting earthwork operations.
2. If visual, olfactory, or other evidence suggests that soils may be contaminated with oil or hazardous materials not already identified in previous studies, the Contractor shall immediately halt soil movement activities and immediately notify the Owner by telephone within one hour of the discovery. Follow up telephone conversation with written correspondence hand delivered within 24 hours of discovery. Contractor shall provide reasonable assistance to Owner and to Owner's Representative for access to potential contamination areas for proper assessment of hazardous conditions.
3. Proper documentation of legal disposal of contaminated soil handled by this Contractor shall be provided by the Contractor to the Owner's Representative, and review authorities. .
4. Unless specifically identified as contaminated material under referenced statues and as defined above, as judged by the Owner's Representative, excavated materials shall be considered unclassified and no payment will be made for off-site disposal of unclassified materials.
5. The Owner may engage an Environmental Consultant to test any earth materials suspected of containing chemical contaminants. The results shall be evaluated by the Environmental Consultant and compared with reporting thresholds. The Owner shall inform the Contractor of the laboratory test results and discuss the possible soil management, disposal, and recycling options available. Contaminated soils shall be managed and handled in compliance with the referenced state/federal regulations, guidelines, and policies. Time and expenses associated with contaminated soils shall be negotiated between the Contractor and the Owner prior to the start of the soil management, soil disposal, and recycling work. Owner reserves the right to negotiate and contract with other entities for remedial work and, in that event, this Contractor shall make reasonable accommodations for other entities to perform this work.

## 3.9 EXCAVATION, FILLING AND ROUGH GRADING AROUND TREES

A. Excavate, fill and rough grade within drip line of trees only where shown on the Drawing or when directed by the Owner's Representative. Notify Owner's Representative prior to any excavation within the drip line of trees.

B. Maintain existing grade within drip line of trees, unless otherwise shown on the Drawings or directed by the Owner's Representative.

C. Place no fill within the drip line of existing trees unless otherwise shown on the Drawings or directed by the Owner's Representative.

## 3.10 TRENCH EXCAVATION

A. Where City permits are required, Contractor shall secure all permits for trench excavation.

B. Excavate as necessary for all drainage pipes, utilities and related structures and appurtenances, and for any other trenching necessary to complete the work. Excavate trenches to allow installation of top of drainage pipe below frost line and to meet the inverts noted on the Contract Documents.

C. Excavate to at least 6 inches below the bottom of pipe or as shown on the Drawings. Excavation to final grade shall be made in such a manner as to maintain the undisturbed bearing character of the soils exposed at the excavation level. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Utilities or piping shall not be laid directly on boulders, cobbles or other hard material. This material shall be removed to a minimum of 6 inches below the bottom of pipe at all points and backfilled or compacted as specified.

E. Remove unsuitable material (e.g. debris, organic soils) encountered at subgrade elevations, backfill with material specified herein and as otherwise indicated on the Drawings, specified or directed. Compact as specified herein.

F. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. In general, the width of trenches shall be kept to a minimum and meet the requirements of the manufacturer of the buried utility. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated on the Contract Documents. However, in all cases, trench excavations shall meet the requirements of OSHA regulations.

3.11 SUBGRADE PREPARATION AND PROTECTION – STRUCTURES, PAVEMENT AND FOUNDATIONS

A. General Requirements

1. Proofroll subgrades and “crushed stone” if applicable under the observation of the Owner’s Representative prior to placement of backfill or foundation.
2. All subgrade areas shall be made ready for fill by removal of all vegetative growth, topsoil, unsuitable soils and deleterious materials under the observation of the Owner’s Representative
3. Any weak or soft spots identified during proofrolling shall be over-excavated and replaced with Dense Graded Crushed Stone or Gravel Fill, placed and compacted in accordance with these specifications.

B. Foundations and Structures

1. Special care shall be taken not to disturb the bottom of the excavation. If the surface upon which the structure is to rest is disturbed, it shall be re-graded and re-compacted to the extent directed by the Owner’s Representative
2. The Owner’s Representative shall assess all subgrades below structures prior to the placement and compaction of structural fill or the construction of foundations.
3. All unsuitable or deleterious materials, existing building foundations, organics (if observed) shall be removed from within proposed foundation footprints and the bearing zone of the proposed footings prior to fill or concrete placement. The bearing zone is defined by a one horizontal to one vertical (1H:1V) line sloping

downward and outward from one foot outside the bottom edge of footings, intersecting undisturbed natural granular soils. Removal of fill, organics (if observed) and other unsuitable materials shall be performed in the dry.

4. Where the subgrade consists of granular soil (sand and gravel) prior to placement of backfill or formwork for footings, proof compact dry subgrades by making 6 passes with a vibratory drum roller having a minimum static weight of 10,000 pounds. Proof rolling in confined areas shall be performed with a minimum of 6 passes of a walk-behind vibratory drum roller or vibratory plate compactor acceptable to the Owner's Representative
5. Static compaction methods (at the sole discretion of the Owner's Representative may be necessary if the natural soils are wet, which would make them more susceptible to disturbance during proof compaction.
6. Crushed stone used to aid in dewatering or subgrade stabilization or as backfill in foundation and structure areas should be wrapped in a non-woven filter fabric where greater than 4 inches in thickness.
7. When the concrete foundation must be placed on rock, the rock shall be excavated to a firm, level-stepped, surface. When disintegrated rock or boulders are encountered, the rock shall be excavated to a depth below the bottom of the proposed structures as directed by the Owner's Representative and replaced with approved Structural Fill, Sand-Gravel, or crushed stone material, thoroughly compacted.

C. Pavement Areas

1. Within new pavement areas, remove existing fill to the minimum depth required to accommodate Finish, Binder and Sand-Gravel Base courses. Existing fill below pavement base course may be left in place provided the subgrade is proof-compacted with a minimum of six passes of a vibratory drum roller (with a minimum static drum weight of 10,000-pounds capable of at least 20,000 pounds of dynamic force.
2. Proofrolling of subgrades must be observed and accepted by the Owner's Representative prior to placement of backfill.

## 3.12 SUBGRADE PREPARATION AND PROTECTION – LANDSCAPE AREAS

A. Landscape Areas: Preparation of subgrade in landscape area, including planting beds and areas of turf establishment, shall be in accordance with the following.

1. All areas of the site that will become lawn or plant beds and have been subjected to any foot or vehicular traffic, equipment storage or material stockpiling during the work of this Contract shall be decompacted to a depth of 24 inches as directed by the Owner's Representative.
2. Vertically and laterally fracture all subgrade areas through deep ripping to restore soil porosity and permeability.
3. Do not fracture soil when it is exceptionally wet or dry. Effective fracturing of the subgrade is only achieved when the soil material is moderately dry to moderately moist.
4. In the presence of the Owner's Representative, perform field analysis of soil moisture conditions in the following manner:
   a. Auger or dig a hole in the subgrade to a depth of 24 inches. Reach in and extract a handful of soil.

b. Hand roll the sample between the palms down to a 1/8-inch diameter snake. If the soil sample crumbles apart in segments no greater than 3/8 of an inch long when it is rolled down to 1/8-inch diameter, it is low enough in moisture for deep ripping.
c. Conversely, if the rolled sample stretches out into increments that are greater than 3/8-inches long then the soil is too moist and plastic for deep ripping.

5. If the soil is at the proper moisture content then de-compact the landscape area by deep ripping, backhoe excavation or other method approved by the Owner's Representative. Decompact to a depth of 24 inches.
6. Re-compact the subgrade in landscape areas to reduce settling but not too much to prevent the movement of water and feeder roots into the subgrade. The subgrade should feel firm to the foot in all areas and make only slight heel prints. Re-compact the subgrade by driving a small, tracked bulldozer over the area at low speeds so that the tracks of the bulldozer pass over the decompacted area and the soil is compacted to a density that will percolate as specified below.
7. Under no circumstances shall wheeled vehicles be driven over subsoil, placed fills or ordinary borrow that have been shown to percolate or subsoil, placed fills or ordinary borrow that has been loosened and shown to percolate.
8. Percolation testing to verify subgrade soils drain water:
   a. Dig a hole in the re-compacted soil that is a minimum of 8 inches in diameter and 8 inches deep.
   b. Fill the hole with water and let it drain completely. Immediately refill the hole with water and measure the rate of fall in the water level.
   c. In the event that the water drains at a rate less than one inch per hour, de-compact the soil again to a depth required to break the over compaction.
   d. Perform a minimum of one soil percolation test per 10,000 square feet area of turf area and 2,500 square feet of tree and shrub planting area as directed by the Owner's Representative.

## 3.13 PLACEMENT, COMPACTION, AND PROTECTION OF MATERIAL

### A. General

1. Prepare bottom of excavations in accordance with requirement of this Section.
2. Compaction by puddling or jetting is prohibited.
3. Maintain the moisture content of backfill and fill materials with the working range of moisture content to allow for proper compaction.
4. Do not place fill on frozen ground.
5. Do not place frozen fill.
6. Do not excavate to full indicated depth when freezing temperatures may be expected, unless footings or slabs can be poured immediately after the excavation has been completed. Protect the excavation from frost if placing of concrete is delayed. Protect poured footing and surrounding subgrade after concrete is poured. Where interior slabs are exposed to freezing temperatures, they are to be protected to prevent frost penetration into the soil upon which they rest.
7. Place fill in uniform horizontal layers and compact immediately after placement. Where the horizontal layer meets a rising slope, the layer shall be keyed into the slope by cutting a bench during spreading of preceding lift.
8. Each layer of fill shall be compacted to the required density the same day it is placed, unless otherwise approved by the Owner's Representative

9. Protect fill areas by grading to drain and providing a smooth surface, which will readily shed water. Grade the surface of the areas in such a manner as to prevent ponding of surface runoff water in areas to receive compacted fill. Slope fill surfaces at the end of each day to provide for free surface drainage.
10. Symmetrical backfill loading shall be maintained such that the level of backfill on either side of walls shall not vary by more than 2 feet. Special care shall be taken to prevent any wedging action or eccentric loading upon or against the structures.
11. Placement of fill shall not begin prior to observation and approval of subgrade conditions by the Owner's Representative
12. Protect foundations, footings, waterproofing, insulation and utilities during backfilling. Repair damage at no additional cost to the Owner.
13. Prior to backfilling, remove unsuitable material, including rubbish, organic materials or other debris. Do not commence filling operations until conditions have been observed by the Owner's Representative
14. Backfill shall not be placed against masonry, concrete or walls until they are braced or have cured sufficiently to develop strength necessary to withstand, without damage, pressure from backfilling and compacting operations.
15. "Loam and Seed" areas shall be protected against erosion until vegetative growth has been established. Re-grade and reseed as necessary until vegetative growth has been established.
16. Upon completion of the work, the final ground surface shall be left in a firm, unyielding, true, uniform condition free from ruts. Repair disturbed areas caused equipment traffic at no additional cost to the Owner.
17. Any trenches or excavations improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then refilled and compacted with the surface restored to the required grade and condition, at no additional expense to the Owner.

B. Equipment

1. Compaction equipment used in open areas where space permits shall consist of ride-on single-drum vibratory rollers with a static weight of at least 10,000 pounds, pneumatic compactors or other similar equipment.
2. Compaction equipment for fill against foundation walls and in other confined areas shall be accomplished by means of drum-type, power-driven, hand-guided vibratory compactors operating at 2,000 cycles per minute, or by hand-guided vibratory plate tampers, with a static weight of at least 300 pounds.

C. Placing Soil Fill

1. Crushed Stone, Gravel, Dense Graded Crushed Stone. Place in loose layers not to exceed 8 inches in thickness prior to compaction when utilizing heavy compaction equipment, and 4 inches when utilizing light hand-operated compaction equipment.
2. No rock in excess of 3 inches in its largest dimension shall be incorporated in the top 3 feet of fill immediately below retaining walls, structures or landscape subgrade.
3. During fill and embankment construction operations, earth moving equipment shall be routed as evenly as possible over the entire width of the work.
4. At the close of each day's work the working surface shall be crowned, shaped, and rolled with smooth steel or pneumatic tired rollers to ensure proper drainage.

5. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders at least 12 inches wide of acceptable soil materials and compact simultaneously with each subbase course and base course layer.

D. Compaction Requirements

1. The degree of compaction is expressed as a percentage of the maximum dry density at optimum moisture content as determined by ASTM Test D1557, Method C. The compaction requirements are as follows:

| Structure, Pavement and Embankment Areas | Minimum Degree of Compaction |
|---|---|
| Common Fill | 92% |
| Structural Fill, Gravel, (Within bearing zone of footings) | 95% |
| Dense Graded Crushed Stone, Gravel (Beneath Pavement and Sidewalks) | 95% |
| More than 4 feet below pavement subgrade | 92% |
| Outside Building & Adjacent to Exterior Building Fdns | 92% |
| Sand, Gravel (Pipe Bedding) | 95% |

Crushed Stone shall be compacted to an unyielding surface as verified by the Owner's Representative.

| Landscape (Lawn and Planting) Areas | Minimum | Maximum |
|---|---|---|
| Fills within lawn and planting areas to within 18 inches of finished subgrade | 82% | 87% |
| Fills within lawn and planting areas in top eighteen inches of finished grade | 85% | 87% |

2. In addition to the stated degree of compaction, all fill and backfill shall receive at least the compactive effort given in the following table. Lift thickness shall not exceed that shown for the compaction method selected, except that the first lift of fill or backfill placed over natural ground in wet conditions may be as much as 12 inches thick. Application of the minimum compactive effort does not relieve the Contractor from her/his requirement to achieve the specified degree of compaction.

| Compaction Method | Maximum Stone Size | Maximum Loose Lift Thickness | | Minimum Number of Passes | |
|---|---|---|---|---|---|
| | | Below Structures and Pavement | Less Critical Areas | Below Structures and Pavement | Less Critical Areas |

| | | | | | |
|---|---|---|---|---|---|
| Hand-operated vibratory plate or light roller in confined areas | 4" | 6" | 8" | 6 | 4 |
| Hand-operated vibratory drum rollers weighing at least 1,000 lbs. | 6" | 8" | 10" | 6 | 4 |
| Light vibratory drum roller, minimum dynamic force 3,000 lbs. per ft. of drum width | 6" | 10" | 14" | 6 | 4 |
| Medium vibratory drum roller, minimum dynamic force 5,000 lbs. per ft. of drum width | 8" | 12" | 18" | 6 | 4 |
| Large vibratory drum roller, minimum dynamic force 8,000 lbs. per ft. of drum width | 10" | 16" | 24" | 6 | 4 |

E. Moisture Control

1. Fill that is too wet for proper compaction (i.e. the in-place moisture content of the soil at that time is greater than three percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction) shall be harrowed, or otherwise dried to a proper moisture content to allow compaction to the required density. If fill cannot be dried within 24 hours of placement, it shall be removed and replaced with drier fill.
2. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.
3. Fill material shall not be placed, spread or rolled during unfavorable weather conditions. When work is interrupted by heavy rains, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

F. Protection of Fill

1. Protection of compacted fill shall be the responsibility of the Contractor. Newly graded areas shall be protected from the elements and traffic. Any settlement or washing that occurs prior to acceptance of the work shall be repaired and grades shall be established to the required elevations and slopes. Damage to any compacted lift (including those lifts previously tested and accepted by the Owner's Representative occurring at any time during the course of construction, which is caused by equipment, moisture entering the embankment, or from any other cause, shall be fully repaired by the Contractor prior to placement of overlying materials, at no additional cost to Owner.
2. In the event of and prior to the commencement of heavy rains, the Contractor shall suspend fill operations as required and shall take all necessary steps to keep the site as well drained as possible. Fill operations shall not be resumed until the moisture content of the fill is such as to permit compliance with the Specifications.

3. All corrective work or operations necessary to maintain proper moisture control of the fill material shall be at the expense of the Contractor.

3.14 TRENCH BACKFILLING

A. General

1. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
2. Trenches shall be backfilled as soon as practicable with suitable approved materials. All trench backfilling shall be done with special care.
3. Place bedding to the full width of the trench. Shape bedding course to provide continuous support for bells, joints, and barrels of pipe and for joints, fittings, and bodies of conduits.
4. Deposit pipe bedding uniformly on both sides of the pipe, for the entire width of the trench to the springline of the pipe. The backfill material shall be placed by hand shovels, in lifts not more than 6 inches thick in loose depth, and each lift shall be thoroughly and evenly compacted by tamping on each side of the pipe to provide uniform support around the pipe.
5. Trench backfilling shall be placed so as not to disturb the previously installed pipes, utilities, concrete, and other work within and near the trench.
6. Place backfill in controlled lifts. Each lift of backfill material shall be compacted to the required degree of compaction specified in this Section.
7. During filling and backfilling operations, pipelines will be checked to determine whether any displacement of the pipe has occurred. If the inspection of the pipelines shows poor alignment, displacement of pipe, or any other defects, the condition shall be remedied by removal, realignment, and backfill of the pipe, in a manner satisfactory to the Owner's Representative at no additional cost to the Owner.

B. The type of materials to be used in bedding and backfilling shall conform to the details shown on the Drawings and as specified in Section 310510 SOILS AND AGGREGATES FOR EARTHWORK.

3.15 CONTRACTOR'S LSP SERVICES

A. In accordance with the requirements of Section 008100 SUPPLEMENTARY REQUIREMENTS. The work of the Contractor's LSP Services will be paid for under Part 4 of this Section.

3.16 MONITORING/HANDLING AND STOCKPILING URBAN FILL SOILS

A. Refer to Section 012100 ALLOWANCES for City reserved dollars for this Work.

B. The work under this Article shall include the testing of contaminated soils, and suspected contaminated soils, and their excavation, handling and stockpiling.

C. Upon discovery of any contaminated or potentially contaminated soils or sediments, the Contractor shall immediately notify the Engineer and the City of Lowell's Environmental Officer. The Contractor will arrange for the Contractor's Licensed Site Professional (Contractor's LSP) to evaluate and assess potential contamination.

D. The Contractor shall notify and schedule a meeting with the City of Lowell's Owner's Representative before hauling any contaminate material off site.

E. The Contractor's LSP shall be responsible for the evaluation of conditions evidencing possible contamination, such as non-natural discoloration of soil, petroleum or chemical odor, the presence of petroleum liquid or sheening on surface or groundwater, buried debris or any abnormal gas or materials in the ground which are known or suspected to be contaminated with oil or hazardous materials. Such evaluation shall include appropriate field tests in conformance with DEP and EPA protocols, and stockpile sampling and laboratory analysis. Sampling under this Item shall all include confirmatory sampling of excavations prior to backfill. All laboratories utilized shall meet the certification requirements of the Massachusetts Department of Environmental Protection (DEP).

F. Excavated materials determined to be contaminated or identified as potentially contaminated by the Contractor's LSP shall be stockpiled onsite in locations approved by the City and by the Owner's Representative. The Contractor shall provide a description and plan of proposed stockpile areas for approval by the Owner's Representative prior to their use. Then City may require the Contractor to test soils within 2 feet of the surface at select stockpile locations to document existing conditions. Throughout the duration of the project, the Contractor will provide a written log which tracks the disposition of all soils excavated, identifying location of excavation, stockpile designation and ultimate disposition of all soil. This log shall be provided to the Owner's Representative and updated no less frequently than every two weeks.

G. Contaminated or potentially contaminated soil shall not be mixed or stockpiled with clean soil. Stockpile areas will be graded such that stormwater runoff is diverted from the stockpiles soils; haybales or equivalent barriers will be placed around the perimeter of the stockpiles to prevent contact of runoff with contaminated soils. Leachate from stockpiles sediments shall be contained/controlled and not allowed to run off or mix with stormwater. Appropriate security will be established to minimize worker and passerby contact with stockpiles. The first lift of the stockpiled soils will be placed on a minimum of two layers of six-mil-thick or one layer of 20-mil- thick polyethylene barrier over existing soils or pavement. Stockpiles will be covered with six-mil- thick black polyethylene cover or equivalent covering to form a continuous waterproof barrier over the soil. The cover must be maintained by the Contractor throughout the stockpile period to prevent water from entering the soils and to prevent blowing dust. The transfer of soil shall be performed in such a manner as to prevent the spread of contaminated or potentially contaminated materials. Unless approved by the Owner's Representative, stockpiles shall be no greater than 500 cubic yards. Each stockpile must be clearly separable from adjacent stockpiles and shall be marked via appropriate signage to conform to the contaminated material tracking log and stockpile plan. The Contractor's LSP shall be responsible for monitoring the Contractor's performance on material transport and stockpile management.

H. Based on pre-characterization data and analysis, the Contractor's LSP may determine that it is possible to live-load trucks for off-site disposition in order to save stockpiling expense.

I. Stockpiled soils will be characterized for purposes of onsite reuse, off-site disposal or recycling based on sampling and analysis to be conducted by the Contractor's LSP. Additional sampling may be required for soils requiring off-site disposal/recycling to meet the requirements of the proposed receiving facility.

J. The Contractor shall be required to supply all personnel and materials necessary to comply with this section and to support the anticipated levels of testing, protection and monitoring described above.

K. Monitoring/handling, stockpiling, covering and loading contaminated soils for disposal shall be considered incidental to the payment items described in Section 012100 ALLOWANCES for disposal in-state and out-of-state for contaminated or potentially contaminated soils. Work to transport and dispose of the contaminated and potentially contaminated soils will be measured for payment by TON as measured in place.

L. Payment for soils testing shall be included in the respective payment items for disposal of contaminated or potentially contaminated soils.

3.17 DISPOSAL OF URBAN FILL SOIL

A. The work of this Article shall include excavation, stockpiling, handling, transportation and disposal of Regulated Soils and Hazardous Materials.

B. The Contractor shall notify and schedule a meeting with the City of Lowell's Owner's Representative before hauling any contaminate material off site.

C. The work of this Article shall also include the cost of any additional laboratory analyses required by a particular disposal facility beyond the standard disposal test set.

D. Excavation of existing subsurface materials may include the excavation of contaminated soils. The Contractor shall be responsible for the proper coordination of characterization, transport and disposal, recycling or reuse of contaminated soils. Disposal, recycling or reuse will be referred to as "disposal" for the remainder of this specification unless otherwise stated. However, regardless of the use of the term herein, there will be no compensation under these items for reuse within the project limits.

E. Coordination shall include the Contractor's LSP and his/her designee overseeing management of contaminated materials. Contaminated soils must be disposed of in a manner appropriate for the soil classification as described below and in accordance with the applicable laws of local, state and federal authorities. The Contractor shall be responsible for identifying a disposal facility(s) licensed to accept the class of contaminated soils to be managed and assure that the facility can accept the anticipated volume of soil contemplated by the project.

F. As noted in Section 008100, the Contractor shall be responsible for hiring a Licensed Site Professional (LSP) and all ancillary professional services including laboratories as needed for this work. The Contractor shall be responsible for obtaining all permits, approvals, manifests, waste profiles, Bills of Lading, etc. subject to the approval of the Owner's Representative prior to the removal of the contaminated soil from the site.

The Contractor and his/her LSP shall prepare and submit to the Owner's Representative for approval all documents required under the Massachusetts Contingency Plan (MCP) and related laws and environmental regulations to conduct characterization, transport, and disposal of contaminated materials.

G. Classes of Contaminated Soils:

1. The Contractor and its LSP shall determine if soil excavated or soil to be excavated is unregulated soil, regulated soil or hazardous waste defined in this section. Such materials shall be given a designation for purposes of reuse or disposal based on the criteria of the Massachusetts Contingency Plan (MCP). Soils and sediments which are not suitable for reuse will be given a designation for purposes of off-site disposal based on the characterization data and disposal facility license requirements. The Classes of Contaminated Soils are defined as follows:
   a. Unregulated Soil:
      1) Unregulated Soil consists of soil, fill and dredged material with measured levels of oil and hazardous material (OHM) contamination at concentrations below the applicable Reportable Concentrations (RCs) presented in the MCP. Unregulated soil consists of material which may be reused on site.
      2) The cost of on-site disposal or reuse of unregulated soil within the project area will be considered incidental to the item of work to which it pertains.
   b. Regulated Soil:
      1) Regulated Soil consists of materials containing measurable levels of OHM that are equal to or exceed the applicable Reportable Concentrations for the site as defined by the MCP, 310 CMR 40.0000. Regulated soil which meets the MCP reuse criteria of the applicable soil/groundwater category for this project area may be reused on site provided that it meets the appropriate geotechnical criteria established by the Owner's Representative. Regulated Soil may be reused (as daily or intermediate cover or pre- cap contouring material) or disposed (as buried waste) at lined landfills within the Commonwealth of Massachusetts or at an unlined landfill that is approved by the Massachusetts Department of Environmental Protection (DEP) for accepting such material, in accordance with DEP Policy #COMM-97-001, or at a similar out-of-state facility. It should be noted that soils which exceed the levels and criteria for disposal at in-state landfills, as outlined in COMM-97-001, may be shipped to an in-state landfill, but require approval from the DEP Division of Solid Waste Management and receiving facility. An additional management alternative for this material is recycling into asphalt. Regulated Soils may also be recycled at a DEP approved recycling facility possessing a Class A recycling permit subject to acceptance by the facility and compliance with DEP Policy #BWSC-94-400. Regulated Soil removed from the site for disposal or treatment must be removed via an LSP approved Bill of Lading, Manifest or applicable material tracking form. This type of facility shall be approved/permitted by the State in which it operates to

accept the class of contaminated soil in accordance with all applicable local, state and federal regulations.

c. Hazardous Waste:

1) Hazardous Waste consists of materials which must be disposed of at a facility permitted and operated in full compliance with Federal Regulation 40 CFR 260-265, Massachusetts Regulation 310 CMR 30.000, Toxic Substances Control Act (TSCA) regulations, or the regulations of other states, and all other applicable local, state, and federal regulations. All excavated materials classified as hazardous waste shall be disposed of at an out-of-state permitted facility. This facility shall be a RCRA hazardous waste or TSCA facility, or RCRA hazardous waste incinerator. This type of facility shall be approved/permitted by the State in which it operates to accept hazardous waste in accordance with all applicable local, state and federal regulations and shall be permitted to accept all contamination which may be present in the soil excavate. The Contractor shall ensure that, when needed, the facility can accept TSCA waste materials i.e. polychlorinated biphenyls (PCBs). Hazardous waste must be removed from the site for disposal or treatment via an LSP approved Manifest.

H. Monitoring/Sampling/Testing Requirements:

1. The Contractor shall be responsible for monitoring, sampling and testing during and following excavation of contaminated soils to determine the specific class of contaminated material. Monitoring, sampling and testing frequency and techniques should be performed in accordance with the requirements of this Section. Additional sampling and analysis may be necessary to meet the requirements of the disposal facility license. The cost of such additional sampling and analysis shall be included in the bid cost for the applicable disposal items. The Contractor shall obtain sufficient information to demonstrate that the contaminated soil meets the disposal criteria set by the receiving facility that will accept the material.
2. No excavated material shall be permanently placed on-site or removed for off-site disposal until the results of chemical analyses have been received and the materials have been properly classified. The Contractor shall submit to the Owner's Representative results of field and laboratory chemical analyses tests within seven days after their completion, accompanied by the classification of the material determined by the Contractor, and the intended disposition of the material. The Contractor shall submit to the Owner's Representative for review all plans and documents relevant to LSP services, including but not limited to, all documents that must be submitted to the DEP.
3. Copies of the fully executed Weight Slips/Bills of Lading/Manifests/Material Shipping Records or other material tracking form received by the Contractor from each disposal facility and for each load disposed of at that facility, shall be submitted to Owner's Representative and the Contractor's LSP within three (3) days of receipt by the Contractor. The Contractor shall be responsible for preparing and submitting such documents for review and signature by the LSP or other appropriate person with signatory authority, three (3) days in advance of transporting soil off-site. The Contractor shall furnish a form attached to each manifest or other material tracking form for all material removed off-site,

certifying that the material was delivered to the site approved for the class of material. If the proposed disposition of the material is for reuse within the project construction corridor, the Contractor shall cooperate with MassDOT to obtain a suitable representative sample(s) of the material to establish its structural characteristics in order to meet the applicable structural requirements as fill for the project.

4. All material transported off-site shall be loaded by the Contractor into properly licensed and permitted vehicles and transported directly to the selected disposal or recycling facility and be accompanied by the applicable shipping paper. At a minimum, truck bodies must be structurally sound with sealed tail gates, and trucks shall be lined and loads covered with a liner, which shall be placed to form a continuous waterproof tarpaulin to protect the load from wind and rain.

I. Decontamination of Equipment:

1. Tools and equipment which are to be taken from and reused off site shall be decontaminated in accordance with applicable local, state and federal regulations. This requirement shall include, but not be limited to, all tools, heavy machinery and excavating and hauling equipment used during excavation, stockpiling and handling of contaminated material. Decontamination of equipment is considered incidental to the applicable excavation item.

J. Regulatory Requirements:

1. The Contractor shall be responsible for adhering to regulations, specifications and recognized standard practices related to contaminated material handling during excavation and disposal activities. MassDOT shall not be responsible at any time for the Contractor's violation of pertinent State or Federal regulations or endangerment of laborers and others. The Contractor shall comply with all rules, regulations, laws, permits and ordinances of all authorities having jurisdiction including, but not limited to, Massachusetts Department of Environmental Protection, the U.S. Environmental Protection Agency, Federal Department of Transportation (DOT), Massachusetts Water Resources Authority (MWRA), the Commonwealth of Massachusetts and other applicable local, state and federal agencies governing the disposal of contaminated soils.
2. All labor, materials, equipment and services necessary to make the work comply with such regulations shall be provided by the Contractor without additional cost to MassDOT. Whenever there is a conflict or overlap within the regulations, the most stringent provisions are applicable. The Contractor shall reimburse MassDOT for all costs it incurs, including penalties and/or for fines, as a result of the Contractor's failure to adhere to the regulations, specifications, recognized standard practices, etc., that relate to contaminated material handling, transportation and disposal.

K. Submittals:

1. Summary of Sampling Results, Classification of Material and Proposed Disposal Option. The following information, presented in tabular format, must be submitted to the Owner's Representative for review and approval prior to any reuse on-site or disposal off-site. This requirement shall be on-going throughout the project duration. At least two weeks prior to the start of any excavation activity, the

Contractor shall submit a tracking template to be used to present the information as stipulated below. Excavation will not begin until the format is acceptable to MassDOT.

2. Characterization Reports shall be submitted for all soil, sediment, debris and groundwater characterized through the sampling and analysis programs required in this Article. Each report shall include a site plan which identifies the sampling locations represented in the Report. The Construction Plan sheets may be used as a base plan to record this information.
3. The Sampling Results shall be presented in tabular format. Each sample shall be identified by appropriate identification matching the sample identification shown on the Chain of Custody Record. The sample must also be identified by location (e.g. grid number or stockpile number). For each sample, the following information must be listed: the classification (unregulated, regulated, etc.), proposed disposal option for the stockpile or unit of material represented, and, all analytical results.
4. Each Characterization Report shall include the laboratory analytical report and Chain of Custody Record for the samples included in the Report.
5. Stockpiling, Transport, and Disposal. At least two weeks prior to the start of any excavation activity, the Contractor shall submit, in writing, the following for review and shall not begin excavation activity until the entire submittal is acceptable to MassDOT.
6. Excavation and Stockpiling Protocol:
    a. Provide a written description of the management protocols for performing excavation and stockpiling and/or direct loading for transport, referencing the locations and methods of excavating and stockpiling excavated material in accordance with Items 180.1 through 180.5.
7. Disposal and Recycling Facilities:
    a. Provide the name, address, applicable licenses and approved waste profile for disposal and recycling location(s) where contaminated soil will be disposed. Present information substantiating the suitability of proposed sites to receive classifications of materials intended to be disposed there, including the ability of the facility to accept anticipated volumes of material.
8. Provide a summary of the history of compliance actions for each disposal/recycling facility proposed to be used by the Contractor. The compliance history shall include a comprehensive list of any state or federal citations, notices of non-compliance, consent decrees or violations relative to the management of waste (including remediation waste) at the facility. Material should not be sent to facilities which are actively considered by the DEP, USEPA or other responsible agency to be in violation of federal, state or local hazardous waste or hazardous material regulations. MassDOT reserves the right to reject any facility on the basis of poor compliance history.
9. Transportation:
    a. The name, address, applicable license and insurance certificates of the licensed hauler(s) and equipment and handling methods to be used in excavation, segregation, transport, disposal or recycling.
10. Material Tracking and Analytical Documentation for Reuse/Disposal.
    a. The following documents will be required for all excavation, reuse and disposal operations and shall be in the format described. At least two weeks prior to the start of any excavation or demolition activity, the Contractor shall submit the tracking templates required to present the

information as stipulated below. Excavation or demolition shall not begin until the format is acceptable to MassDOT.

b. All soils, sediments and demolition debris must be tracked from the point of excavation to stockpiling to onsite treatment/processing operations to off-site disposal or onsite reuse as applicable.

c. Demolition Debris. Demolition debris must be tracked if the debris is stockpiled at a location other than the point of origin or if treatment or material processing is conducted. Identification of locations will be based on the station-offset of the location. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations/comments, quantity, and stockpile ID/processing operation location. For each unit of material tracked, the table will also track reuse of the material on- site, providing reuse date, location of reuse as defined by start and end station, width of reuse location by offset, the fill elevation range, quantity, and finish grade for said location. For demolition debris which is not reused on site, the table will also track disposal of the material as defined by disposal date, quantity and disposal facility. The table must provide a reference to any analytical data generated for the material.

d. Soil/Sediment. Soil excavation will be identified based on the station-offset of the excavation location limits. The tracking table will identify date and point of generation, any field screening such as PID or dust monitoring, visual observations, quantity, and stockpile number/location. For each unit of material tracked, the table will also track reuse of the material on-site and disposal of the material offsite using the same categories identified for demolition debris above.

## 3.18 INSPECTION AND TESTING FOR ASBESTOS

A. Refer to Section 012100 ALLOWANCES for City reserved dollars for this Work.

B. Inspection and testing for asbestos will be limited to the exposed to view pipes on the River Wall below the Cox Bridge.

C. The work shall include the inspecting and testing of all materials suspected of containing asbestos. When any demolition is required to enable the inspection and testing of the suspected material it will be considered incidental to this Item and the Contractor must perform all asbestos handling and testing in accordance with the regulations stated below.

D. Contractor shall notify the Owner’s Representative if asbestos testing or inspection is proposed.

E. Dust suppression in the form of light water sprays, foams, dust suppressants and calcium chloride will be implemented as required to control dusting during any disturbance of asbestos suspected material. Alternatively, intrusive activities may be reduced or curtailed under high wind or heavy rain conditions, which in the opinion of the Health and Safety Plan (HASP) may pose a safety hazard to the workers.

F. The Contractor shall employ the services of a Massachusetts licensed "Asbestos Inspector" to inspect the material to determine whether or not Item 311000.08

ASBESTOS REMOVAL, OUT-OF-STATE is required. Should the asbestos inspector determine laboratory testing is required, a state certified laboratory shall be used to perform all necessary tests.

G. Regulations

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) including but not limited to:
   a. 29 CFR 1910 Section 1001 and 29 CFR 1926 Section 58 Occupational exposure to Asbestos, Tremolite, Anthophyllite and Actinolite, Final Rule
   b. 29 CFR 1910 Section 134 Respiration Protection
   c. 29 CFR 1926 Construction Industry
   d. 29 CFR 1910 Section 2 Access to Employee Exposure and Medical Records
   e. 29 CFR 1910 Section 1200 Hazard Communication
   f. 29 CFR 1910 Section 145 Specifications for Accident Prevention Signs and Tags
2. U.S. Environmental Protection Agency, (EPA) including but not limited to:
   a. 40 CFR 762, CPTS 62044, FRL 2843-9, Federal Register Vol. 50 no.134, July 12, 1985 p.28530 - 28540 Asbestos Abatement Projects Rule
   b. 40 CFR 61 Subpart A Regulation for Asbestos
   c. 40 CFR 61 Subpart M (Revised Subpart B) National Emission Standard for Asbestos
3. U.S. Department of Transportation 49 CFR 172 and 173
   a. Massachusetts Department of Labor and Industries Regulations, (DLI) including but not limited to:
   b. 453 CMR 6.00 Removal, Containment and Encapsulation of Asbestos
4. Massachusetts Department of Environmental Protection (DEP) including but not limited to (supplementing subsection 7.01):
   a. 310 CMR 7.00, Section 7.09 Odor and Dust, Section 7.10 Noise, Section 7.15 Air Pollution
   b. 310 CMR 18.00 and 19.00 Solid Waste Regulations
5. Massachusetts Division of Industrial Safety 45 CMR 10.00
6. Local Requirements including but not limited to those of Health Departments, Fire Departments and Inspection Services Departments
7. Wherever there is a conflict or overlap of the above references, the most stringent provision shall apply.

## 3.19 REMOVAL OF ASBESTOS

A. The work of this Article will be will be limited to removing asbestos from around the exposed to view pipes on the River Wall below the Cox Bridge.

B. The Contractor shall notify and schedule a meeting with the City of Lowell’s Owner’s Representative before hauling any asbestos off site.

C. The work shall include the removal and satisfactory disposal of existing asbestos if encountered during construction. The Contractor's attention is directed to the fact that existing asbestos shall be inspected and tested prior to removal, to determine if special removal and disposal is required. The Contractor shall follow all the rules and regulations stated in Article titled INSPECTION AND TESTING FOR ASBESTOS. If

asbestos is present, the Contractor shall follow all the rules and regulations stated in the Paragraph titled REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS", under this item. The Contractor should notify and coordinate his/her efforts with the proper utility accordingly.

D. Removal and Disposal of Asbestos Containing Materials: This section specifies the requirements for the handling and removal of asbestos containing material. The Contractor must perform all asbestos handling and removal work in accordance with these specifications and the following additional requirements.

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA) including but not limited to:
   a. 29 CFR 1910 Section 1001 and 29 CFR 1926 Section 58 Occupational exposure to Asbestos, Tremolite, Anthophyllite and Actinolite, Final Rule
   b. 29 CFR 1910 Section 134 Respiration Protection
   c. 29 CFR 1926 Construction Industry
   d. 29 CFR 1910 Section 2 Access to Employee Exposure and Medical Records
   e. 29 CFR 1910 Section 1200 Hazard Communication
   f. 9 CFR 1910 Section 145 Specifications for Accident Prevention Signs and Tags
2. U.S. Environmental Protection Agency, (EPA) including but not limited to:
   a. 40 CFR 762, CPTS 62044, FRL 2843-9, Federal Register Vol. 50 no.134, July 12, 1985 p.28530 - 28540 Asbestos Abatement Projects Rule
   b. 40 CFR 61 Subpart A Regulation for Asbestos
   c. 40 CFR 61 Subpart M (Revised Subpart B) National Emission Standard for Asbestos
3. U.S. Department of Transportation 49 CFR 172 and 173
4. Massachusetts Department of Labor and Industries Regulations, (DLI) including but not limited to:
   a. 453 CMR 6.00 Removal, Containment and Encapsulation of Asbestos
5. Massachusetts Department of Environmental Protection (DEP) including but not limited to (supplementing subsection 7.01):
   a. 310 CMR 7.00, Section 7.09 Odor and Dust, Section 7.10 Noise, Section 7.15 Air
6. Pollution Control Regulations
   a. 310 CMR 18.00 and 19.00 Solid Waste Regulations
7. Massachusetts Division of Industrial Safety 45 CMR 10.00
   a. Local Requirements including but not limited to those of Health Departments, Fire Departments and
   b. Inspection Services Departments
8. Wherever there is a conflict or overlap of the above references, the most stringent provision shall apply.

E. All asbestos material shall be removed and properly disposed of by a contractor or subcontractor with a current Massachusetts Abatement Contractors License issued by the Department of Labor and Industries. Work shall be supervised by a competent person as required by OSHA in 29 CFR 1926 to ensure regulatory compliance. This person must have completed a course at an EPA Training Center or equivalent course in asbestos abatement procedures, have had a minimum of four years on-the-job training and meet any additional requirements set forth in 29 CFR 1926 for a

Competent Person. This person must also be certified by the Commonwealth as an Asbestos Abatement Supervisor and Asbestos Abatement Project Designer as required by 453 CMR 6.00.

F. Asbestos removal work shall be coordinated with all other work under the contract and shall be completed prior to performing any activities which could disturb the asbestos material or produce airborne asbestos fibers.

G. Dust suppression in the form of light water sprays, foams, dust suppressants and calcium chloride will be implemented as required to control dusting during trenching and excavation. Alternatively, intrusive activities may be reduced or curtailed under high wind or heavy rain conditions, which in the opinion of the HASP may pose a safety hazard to the workers.

H. Notification and Permits

1. The Contractor shall prepare a formal pre-notification form at least ten (10) days prior to the start of asbestos removal work. This form must be submitted to the appropriate Regional Office of the Massachusetts Department of Environmental Protection and to the U.S. Environmental Protection Agency Region I Air and Hazardous Material Division. A copy of the submitted forms must be provided to the Owner's Representative and kept at the work site.
2. Prior to starting any work, the Contractor shall also obtain any required asbestos removal permit(s) from the city/town. A copy of the permit(s) must be provided to the Owner's Representative and posted at the work site.
3. The Contractor shall also obtain and pay all other applicable asbestos waste transportation and disposal permits, licenses and fees.

I. Standard Operating Procedures

1. The standard operating procedure shall ensure the following:
   a. Proper site security including posting of warning signs and restricting access to prevent unauthorized entry into the work spaces.
   b. Proper protective clothing and respiratory protection prior to entering the work spaces.
   c. Safe work practices including provisions for communications; exclusion of eating, drinking, smoking, or use of procedures or equipment that would in any way reduce the effectiveness of respiratory protection or other engineering controls.
   d. Proper exit practices from the work space though the showering and decontamination facilities.
   e. Removing asbestos containing material in ways that minimize release of fibers.
   f. Packing, labeling, loading, transporting and disposing of contaminated material in a way that minimizes or prevents exposure and contamination.
   g. Emergency evacuation of personnel, for medical or safety (fire and smoke) so that exposure will be minimized.
   h. Safety from accidents in the work space, especially from electrical shocks, slippery surfaces and entanglements in loose hoses and equipment.
   i. Provisions for effective supervision and OSHA - specified personnel air monitoring for exposure during work.

J. Required Submittals

1. The Contractor shall submit to the Owner's Representative the following listed items at least ten (10) calendar days prior to the start of asbestos work. No asbestos removal work activities shall commence until these items are reviewed by the Owner's Representative, unless otherwise waived. Submittals shall be clearly labeled and in sufficient detail to enable the Owner's Representative to form an opinion as to its conformity to the specifications.
   a. Name, experience and DLI certification of proposed Supervisors and Foreman responsible for asbestos work.
   b. Summary of workforce by disciplines and a notarized statement documenting that all proposed workers, by name, have received all required medical exams and have been properly trained and certified for asbestos removal work, respirator use and appropriate Massachusetts DLI, EPA and OSHA standards.
   c. Notarized statement that workers are physically fit and able to wear and use the type of respiratory protection proposed for the project. Notarized certification signed by an officer of the abatement contracting firm that exposure measurements, medical surveillance and worker training records are being kept in conformance with 29 CFR
   d. Written plan of action and standard operating procedures to include: location and layout of decontamination areas; sequencing of asbestos work; detailed schedule of work activities by date and interface with other project activities which affect work performance; methods used to assure safety and security; worker protection and exposure monitoring; contingency and emergency evacuation procedures; detailed description of methods to be employed to control pollution; waste handling procedures.
   e. Written respiratory protection program specifying level of protection intended for each operation required by the project and details of daily inspection and maintenance elements.
   f. Copies of the U.S. EPA, State and local asbestos removal pre-notification forms. If applicable, lists and copies of all permits, licenses, or manifests which will be applied for and used.
   g. Name, location and applicable approval certificates for primary and secondary landfill for disposal of asbestos-containing or asbestos contaminated waste. Name, address and license number(s) of hauler permitted to transport waste. (Submit copies of completed manifests upon disposal).

K. The Contractor must provide copies of daily inspection and record logs upon request of the Owner's Representative, at any time during project. This information will include but is not limited to work area entry data, respirator inspections and maintenance, HEPA-exhaust inspections and maintenance and other work applicable activities or reports of accidents or unusual events.

3.20 DUST CONTROL

A. The Contractor shall take special measures to control dust on site including, but not limited to, wetting exposed soil in order to prevent annoyance/and or damage to adjacent

property. Calcium chloride or any other chemical material shall not be used on stockpiles.

B. The Contractor shall take all necessary measures to keep streets and private ways, over which equipment and service for project travel, clean and free from dirt, dust, mud and debris resulting from construction operations. The actions taken shall meet the requirements of all authorities having jurisdiction.

3.21 REMOVAL OF SURPLUS AND UNSUITABLE MATERIALS

A. Excavated materials unsuitable for reuse, debris, mud, surplus excavated soil not used to fulfill requirements of the Contract, and surplus imported fill shall become the property of the Contractor and shall be removed from the site in accordance with the regulations and requirements of all municipalities or agencies having jurisdiction over the disposal sites and the route between the project and the disposal sites, at no cost to the Owner. Disposal of potentially contaminated materials shall be in accordance with the requirements of this Section.

B. No excavated material shall be removed from the site of the work or disposed of, except as directed by the Owner's Representative When removal of surplus materials has been approved by the Owner's Representative, dispose of such surplus material in approved designated areas.

C. Remove and dispose of all pieces of ledge and boulders which are not suitable for use in other parts of the work. Rock disposed of by hauling away to spoil areas is to be replaced by approved surplus excavation obtained elsewhere on the work, insofar as it is available. Any deficiency in the backfill material shall be made up with acceptable material approved by the Owner's Representative.

3.22 CLEANUP and Restoration of Excavations

A. At the end of all stripping and stockpiling operations and before acceptance of the work, the Contractor shall remove all debris, rubbish, garbage, trash, and discarded material, from the site and be dispose of them in a manner satisfactory to the Owner's Representative The premises shall be left clean, presentable, and satisfactory.

B. The surface of any driveway, parking area, or any other area which is disturbed by the excavation and which is not a part of the paved road shall be restored to a condition at least equal to that existing before work began.

C. In sections where the pipeline passes through grassed areas, and at the Contractor's own expense, remove and replace the sod, or loam and seed the surface to the satisfaction of the Owner's Representative

D. In sections where the pipeline passes through landscaped areas, the Contractor shall, at her/his own expense, remove and replace the topsoil, mulch or other material to the satisfaction of the Owner's Representative.

PART 4 - MEASUREMENT AND PAYMENT

4.1 METHOD OF MEASUREMENT

A. Notifying all affected utility companies and Dig Safe before starting work will be considered incidental to the Work of this Contract. No separate measurement will be made for this Work but shall be considered incidental to the Work of all other Sections where excavation is required.

B. Miscellaneous work, including soil testing, protections of existing structures and foundations, permitting and permitting costs, police protections, monitoring/handling/stockpiling/loading soils, and all other small items of work that may come along from time to time as determined by the Owner's Representative will be considered incidental to the Work of this Contract. No separate measurement will be made for this work but shall be considered incidental to the work of this Contract.

C. Stripping and stockpiling topsoil will be considered incidental to the Work of Sections 024113 SELECTIVE SITE DEMOLITION if the soil is to be discarded and considered incidental to the work of Sections 329200 SEEDED TURF and 329300 PLANTING if the soil is to be reused. No separate measurement will be made for this Work but shall be considered incidental to the Work of all other Sections where stripping and stockpiling topsoil is required.

D. Unless otherwise stipulated in this Part 4: excavation; soils and aggregates; backfilling and filling; trench excavation and backfilling; rough grading; stockpiling soils and materials; establishing grades and elevations; subgrade preparation; protections of existing facilities, landscape elements and structures to remain; dust control; placement, compaction and protection of materials; removal of surplus and unsuitable material; and final cleanup and restoration of the site following the work of this Section will be considered incidental to the Work of this Contract. No separate measurement will be made for this Work but shall be considered incidental to the Work of Divisions 01, 02, 03, 04, 05, 06, 08, 26, 31 and 32 where soils and aggregates are required.

E. Item 311000.01 Miscellaneous Trench Excavation and Backfilling of/with common fill will be measured per CUBIC YARD, including all labor, materials and equipment required or incidental for the satisfactory completion of the Work.

F. Item 311000.02 Rock Removal will be measured per CUBIC YARD, including all labor, materials and equipment required or incidental for the satisfactory completion of the Work

G. Item 311000.03 Regulated Soil Disposal Out-of-State will be measured per TON of materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, monitoring, handlings, stockpiling and loading, transportation and disposal, required or incidental for the satisfactory completion of the Work.

H. Item 311000.04 Regulated Soil Disposal In-State will be measured per TON of materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, monitoring, handlings, stockpiling and loading, transportation and disposal, required or incidental for the satisfactory completion of the Work.

I. Item 311000.05 Hazardous Waste Disposal Out-of-State will be measured per TON of materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, monitoring, handlings, stockpiling and loading, transportation and disposal, required or incidental for the satisfactory completion of the Work.

J. Item 311000.06 Inspection and Testing for Asbestos will be measured per EACH, including all labor, materials, testing and equipment required or incidental for the satisfactory completion of the work.

K. Item 311000.07 Asbestos Disposal Out-of-State will be measured per CUBIC FOOT of materials removed from the site and transported to and disposed of at an approved location or licensed facility, and includes any and all costs for approvals, permits, fees and taxes, additional testing/characterization required by the facility beyond the standard disposal test set, decontamination procedures, monitoring, handlings, stockpiling and loading, transportation and disposal, required or incidental for the satisfactory completion of the Work.

L. Item 311000.08 Contractor’s LSP Services will be measured per HOUR, including all labor, materials, testing and equipment required or incidental for the satisfactory completion of the Work.

M. Item 311000.09 Healthy and Safety Plan will be measured LUMP SUM, including all labor, materials, equipment and incidental costs required for the satisfactory completion of the Work.

4.2 BASIS OF PAYMENT

A. The Work measured as provided above will be paid by payment items. Such price shall constitute full compensation for all labor, materials and equipment required or incidental for the satisfactory completion of the Work as described in this Section.

4.3 PAYMENT ITEMS

| | | |
|---|---|---|
| 311000.01 | MISCELLANEOUS TRENCH EXCAV. & BACKFILL | CUBIC YARD |
| 311000.02 | ROCK REMOVAL | CUBIC YARD |
| 311000.03 | REGULATED SOIL DISPOSAL, OUT-OF-STATE | TON |
| 311000.04 | REGULATED SOIL DISPOSAL, IN-STATE | TON |
| 311000.05 | HAZARDOUS WASTE DISPOSAL, OUT-OF-STATE | TON |

| | | |
|---|---|---|
| 311000.06 | INSPECTION AND TESTING FOR ASBESTOS | HOURS |
| 311000.07 | ASBESTOS DISPOSAL, OUT-OF-STATE | CUBIC FOOT |
| 311000.08 | CONTRACTOR'S LSP SERVICES | HOUR |
| 311000.09 | HEALTH AND SAFETY PLAN | LUMP SUM |

END OF SECTION

This Page Left Intentionally Blank